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tween the Block Island strata and those of Long Island and the islands to the eastward was commented upon by them and by others. If the article in question went no further than this it would attract but little attention. The conclusions which the author draws, however, are so startling that they require the earnest consideration of everyone who has ever had any experience in the geology of the region.

For example: "The well-known clay deposits of Long Island I have not carefully examined in place. *There is much in the published description of them, however, to indicate that they may represent some of the same Jurassic beds.*"

Inasmuch as the present writer thought that the Cretaceous age of the clays at Glen Cove, Northport, etc., had been thoroughly proven and the Tertiary age of others had at least been satisfactorily indicated,\* the above surmise is highly interesting and any proofs of their Jurassic age are anxiously awaited.

Again, "The clay bluffs at Gay Head, in Martha's Vineyard have many characteristics of the same series, but the presence of Cetacean remains in one portion of them indicates that this is Tertiary. There are, however, some reasons for supposing that the most of the clays are much older, *and I believe that they contain representatives of the same great Jurassic formation.*"

As these deposits have been amply proven, by David White,† Merrill,‡ Shaler,§ and the writer,|| to consist of Cretaceous and later strata, the expression of a mere belief in regard to their Jurassic age seems somewhat superfluous.

In a postscript the author says that since his article was in print he has visited Long Island and Martha's Vineyard, and states: "On Martha's Vineyard I found that the great series of variegated clays forming Gay Head, *and gener-*

*ally regarded as Tertiary, are certainly Mesozoic, and all apparently Jurassic.*"

In view of what has already been proven, the above statement is the most surprising of all, and as he concludes with the promise, "I hope soon to discuss this subject more fully elsewhere," the appearance of the discussion is looked for with great interest.

[The italics in the text are mine. A. H.]

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#### THE CURVE-TRACING TOP.

IN reply to Mr. C. B. Warring's suggestion of smoked surfaces, I would say that two of my students have for some time been engaged in computing the moment of inertia of the top from its mass, the radius of the point, the dip, the instantaneous period of precession and the difference of the cardinal radii of curvature of the curves drawn very nearly the maximum distance between two consecutive spires. They have tried lampblack surfaces, but have given them up because the substance is apt to flake off at sharp angles and the curves are not satisfactory. Mr. Warring's own design bears this out. Moreover, Mr. Warring seems to have missed the point of my article. I value the result in proportion to the simplicity of the means employed. To use lampblack and varnish is to go much out of one's way.

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#### NEW APPLES.

TO THE EDITOR OF SCIENCE: As a contribution to your freak apple discussion in your issue of September 4th, where the phenomenon is described as a pollen phenomenon, and continued in your issue of October 2d, I send the following cutting from John Lewis Child's Fall Catalogue of 1896:

"*Two-Faced*—We never brought out a more unique novelty than this. It originated in Cayuga county, N. Y., and the original tree has been known for many years, but this is the first time it has ever been propagated and put upon the market. The tree bears an apple which is in size and shape similar to the Tallman Sweet; its peculiarity being that every fruit

\* *Trans. N. Y. Acad. Sci.*, xii. (1893), pp. 222-337; *ibid.* xiii. (1894), pp. 122-129. *Bull. Torr. Bot. Club*, xxi. (1894), pp. 49-65. *Trans. N. Y. Acad. Sci.*, xv. (1895), pp. 3-10.

† *Am. Journ. Sci.*, xxxix. (1890), pp. 93-101; *Bull. Geol. Soc. Am.*, i. (1890), pp. 554, 555.

‡ *Trans. N. Y. Acad. Sci.*, iv. (1885), pp. 78, 79.

§ *Bull. Mus. Comp. Zool.*, xvi., No. 5 (1889), pp. 89-97.

|| *Trans. N. Y. Acad. Sci.*, xiii. (1893), pp. 8-22; *Bull. Geol. Soc. Am.*, vii. (1895), pp. 12-14.

is divided. One-half is sour, like a Greening, and the other half is sweet, like the Tallman. This is one of the most peculiar freaks which has ever been observed in vegetation. Its oddity, as well as its fine bearing qualities, and the excellent quality of the fruit, both the sweet and sour portion, will make it immensely popular."

I also send for your examination a *Dahlia* stem bearing two flowers of different colors.

E. LEWIS STURTEVANT.

SOUTH FRAMINGHAM, MASS., October 6, 1896.

[The one *Dahlia* is light pink, becoming darker towards the center, the other dark maroon with a few pink petals near the center. Ed.]

#### THE LIMITS OF SCIENCE.

PRESIDENT MEES, in his address before Section B (Physics) of the American Association for the Advancement of Science (printed in the last number of this JOURNAL) states that the progress of science "may be expressed by a curve approaching truth asymptotically, probably never in human experience approaching to its *complete* knowlege. So long as investigators find that they are working upon the steep part of the curve where it approaches truth rapidly, there is no lack of interest; this, however, seems to die out quickly when much labor and great patience are required to extend experimentally the curve now more slowly approaching complete knowledge, or straighten out some of its irregularities."

I should myself regard the progress of science from a very different point of view. Knowledge does not seem to me to approach final truth as an asymptote, but rather to be an irregular sphere in endless space. The more we enlarge our little sphere the greater is the surface at which our knowledge touches our ignorance. The more we learn the greater is the area immediately awaiting exploration.

It is true, as President Mees states, that a man or group of men of unusual insight carry forward our knowledge, and the details must be filled in until the average has arrived at the point reached by the positive variations. Then new positive variations carrying our knowledge further are more likely. But there has never before been a time when it was pos-

sible for a man of genius to make such great advances and in so many directions.

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#### RUTGERS COLLEGE MUSEUM.

TO THE EDITOR OF SCIENCE: The Geo. H. Cook Museum of Geology occupies the two upper stories of Geological Hall, which was built in 1871. The museum proper is 84 feet long, 40 feet wide and about 23 feet high, with a gallery 6 feet wide on all sides. The upper and lower class rooms open directly into the museum by double doors.

The Cook collection of minerals occupies six cases on the east side of the room, and numbers over 4000 specimens. The fossils, and specimens illustrating geology, are arranged in six cases on the west side, which, with two large cases on the floor, of rocks, iron and zinc ores, clays, sands and marls (including fossil bones and shells found in the marls) of New Jersey, number 5250 specimens.

The Lewis C. Beck collection of minerals fills two large cases on the floor, and contains 3000 specimens, mostly collected over fifty years ago. Many of them are the original specimens used in some of the old State reports and text-books, and it is really a historic collection of great value to the mineralogist. The pseudomorphs are specially valuable to the lithologist and mineralogist. The center of the floor is occupied by a case of Ellenville quartz crystals, showing also crystals of Chalcopyrite, Sphalerite and Galenite. This collection is a gem!

On the floor near the entrance is a mass of Jura-Trias sandstone 8x18 feet, from Morris Co., N. J., showing fifteen species of dinosaurian footprints. This is said to be the largest and best specimen of saurichnites in this country.

The Mannington (N. J.) mastodon, which was set up last June, covers a space 8x20 feet at the north end of the room.

A diamond-drill core in the gallery shows a section of the rock at the Franklin zinc mines, 1378 feet in depth.

Cases are being built for the large collection of paleolithic implements numbering about 1500 specimens, which include many fine pipes and ceremonial and ornamental objects.